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Date

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In the application of: Carpenter, et al.

Serial No.: To be determined

Filing Date: 23 October 2001

For: Techniques for Growth and

DIFFERENTIATION OF HUMAN PLURIPOTENT STEM CELLS Art Unit: To be determined

Examiner: To be determined

INFORMATION DISCLOSURE STATEMENT

Assistant Commissioner for Patents Washington, D.C. 20231

Dear Sir:

The information listed in the accompanying form PTO-1449 and provided herewith may be material to examination of this application and is submitted in compliance with the duty of disclosure under 37 CFR § 1.56. The Examiner is requested to make this information of record in the application.

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PATENT Serial No. TBD Docket: 091/009C

This Information Disclosure Statement is not to be construed as a representation that a full search for relevant information has been made, that all relevant information has been found, or that the information provided with this Statement is considered to be material to patentability of the claimed invention as defined under 37 CFR § 1.56(b).

It is believed that no fee is required for submission of this Statement, which is filed before the first Office Action on the merits of the application. Nevertheless, should a fee be required for consideration of this Statement and the listed information, the Assistant Commissioner is authorized to charge such fee to Deposit Account No. 07-1139, referencing the attorney Docket Number indicated above.

Respectfully submitted,

J. Michael Schiff

Registration No. 40,253

GERON CORPORATION 230 Constitution Drive Menlo Park, CA 94025 Telephone: (650) 473-7715

Fax: (650) 473-8654

DATE: November <u>29</u>, 2001

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Form 1449 (modified) Information Disclosure

Statement By Applicant

(Use Several Sheets if Necessary)

Docket: 091/009C

Title: Techniques for Growth and Differentiation of Human Stem Cells

Inventors: Carpenter, M.K., et al.

Filing Date: 23 October 2001

Group: To Be Assigned PAI2. 36

U.S. Patent Documents

Examiner Initial	Ref.	Patent No.	Filing Date	Issue Date	Class/ Subclass	Inventors:	Title:
	А	5,104,795	2/14/90	4/14/92	435/69.1	Lee, J-H., et al.	Shortened Phosphoglycerate Kinase Promoter
	В	5,166,065	3/31/90	11/24/92	435/240.1	Williams, R., et al.	In Vitro Propagation of Embryonic Stem Cells
	С	5,234,809	7/1/91	8/10/93	435/91	Boom, W., et al.	Process for isolating nucleic acid
	D	5,332,672	4/9/92	7/26/94	435/240.2	Conover, J., et al.	Prevention of ES Cell Differentiation by Ciliary Neurotrophic Factor
	E	5,405,772	6/18/93	4/11/95	435/240.31	Ponting, I.,	Medium For Long-Term Proliferation and Development of Cells
····	F	5,453,357	10/8/92	9/26/95	435/7.21	Hogan, B.	Pluripotential embryonic stem cells and methods of making same
	G	5,523,226	5/14/93	6/4/96	435/240.2	Wheeler, M.	Transgenic Swine Compositions and Methods
	н	5,583,016	10/27/94	12/10/96	435/91.3	Villeponteau B, et al.	Mammalian Telomerase
	- 1	5,639,618	5/13/94	6/17/97	435/7.21	Gay, D.	Method of Isolating a Lineage Specific Stem Cell In Vitro
	J	5,643,761	10/27/93	7/1/97	435/91.1	Fisher, P., et al.	Method for Generating A Subtracted CDNA Library and Uses of the Generated Library
	к	5,672,499	6/7/95	9/30/97	435/240.4	Anderson, D., et al.	Immortalized Neural Crest Stem Cells and Methods of Making
	L	5,789,158	5/18/95	8/4/98	435/6	Knowles, B., et al.	Developmental Embryonic Mouse CDNA Libraries
	М	5,840,484	1/27/94	11/24/98	435/6	Seilhamer, J., et al.	Comparative Gene Transcript Analysis
	N.	5,843,780	1/18/96	12/1/98	435/363	Thomson, J.	Primate embryonic stem cells
	0	5,856,136	7/3/96	1/5/99	435/69.3	Au-Young, J.	Human Stem Cell Antigens
	P	5,914,268	11/21/94	6/22/99	435/325	Keller, G., et al.	Embryonic Cell Populations and Methods to Isolate Such Populations
	Q	5,922,597	7/14/97	7/13/99	435/372.1	Verfaillie, C., et al.	Ex Vivo Culture of Stem Cells
	R	5,942,435	6/6/95	8/24/99	435/325	Wheeler, M.	Transgenic Swine Compositions and Methods
	S	5,968,829	9/5/97	10/19/99	435/467	Carpenter, M.	Human CNS Neural Stem Cells
	Т	5,981,165	6/7/95	11/9/99	435/4	Weiss, S., et al.	In Vitro Induction of Dopaminergic Cells
	υ	6,040,180	5/7/97	3/21/00	435/377	Johe, K.	In Vitro Generation of Differentiated Neurons From Cultures of Mammalian Multipotential CNS Stem Cells

Examiner	Date Considered

Examiner: Initial if citation considered, whether or not citation is in conformance with MPEP 609; draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant. PTO-1449 — Page 1

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Docket: 091/009C

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Information Disclosure

Statement By Application

Title: Techniques for Growth and Differentiation of Human Pluripotent Stem Cells

Inventors: Carpenter, M.K., et al.

(Use Several Sheets if Necessary)

Filing Date: 23 October 2001

Group: To Be Assign

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Examiner Initial	Ref.	Patent No.	Filing Date	Issue Date	Class/ Subclass	Inventors:	Title: DEC 0	
	>	6,261,556	Oct 18/99	Jul 17/01	424/94.5	Weinrich SL et al.	Purified Telomerase TECH CENTER	1600/

	Т	1	Foreign Pa	tent or Publi	shed Foreign Patent Application	T =	
Examiner Initial	Ref.	Document No.	Publ. Date	Juris- diction	Title:	Translati Yes	N O
	w	WO 94/07997	4/14/94	PCT	Long-term Proliferation of Primordial Germ Cells		Ť
	х	WO 96/17627	6/13/96	PCT	System for the Maintenance, Growth and Differentiation of Human and Non-Human Primate Pluripotent Stem, Progenitor and Mature Bone Marrow Cells		T
	Υ	WO 97/21802	6/19/97	РСТ	Novel Embryonic Cell Populations and Methods to Isolate Such Populations		
	z	WO 97/28253	8/7/97	PCT	Method for Culturing Cells Having Angiogenic Potential	Abstract	x
	АА	WO 97/30151	8/21/97	РСТ	Cytokine Expressed by Dia/Lif-Deficient Embryonic Stem Cells for the Inhibition of Differentiation		
	АВ	WO 97/47734	12/18/97	РСТ	In Vitro Derivation and Culture of Primate Pluripotent Stem Cells and Therapeutic Uses Thereof		
	AC	WO 98/00540	1/8/98	PCT	Human Stem Cell Antigens, DNA Coding Therefor and Their Use		
	AD	WO 98/30679	7/16/98	PCT	Embryonic Stem Cell Serum Replacement		
	AE	WO 98/43679	10/8/98	РСТ	Human Embryonic Germ Cell Line and Methods of Use		
	AF	WO 99/01552	1/14/99	РСТ	Fluorescent Proteins as Cell-Type Specific Reporter	Abstract	×
	AG	WO 99/10535	3/4/99	PĊT .	A Process to Study Changes in Gene Expression is Stem Cells		
	АН	WO 99/20741	4/29/99	PCT	Methods and Materials for the Growth of Primate- Derived Primordial Stem Cells		
	Al	WO 99/42122	8/26/99	РСТ	Method of Promoting Embryonic Stem Cell Proliferation		
	AJ	WO 99/43785	9/2/99	PCT	Derivation of Cells and Tissues from Embryonic Pre- Stem Cells for Transplantation Therapies		
	AK	EP 0695 351 B1	12/8/99	EP	Isolation, Selection and Propagation of Animal Transgenic Stem Cells		
	AL	FR 2744133	8/1/97	FR	Procedure for Culturing Cells with Morphogenic Potential for Inducing Morphogenesis of the Aforesaid Cells, Models in Vitro of Vascular Morphogenesis thus Obtained, and their Modification for Drug Screening	Summary	×
					Derwent Summary of WO 97/28253 and FR 2744133		1

Examiner	Date Considered

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Docket: 091/009C

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Information Disclosure

Stem Cells

Title: Techniques for Growth and Differentiation of Human Pluripotent

Inventors: Carpenter, M.K., et al.

Statement By Applicant

Filing Date: 23 October 2001

Group: To Be Assigned

(Use Several Sheets if Necessary)

Other Documents

Examiner Initial	Ref.	Author, Title, Date, Source
	АМ	Amit, M., et al., Clonally Derived Human Embryonic Stem Cell Lines Maintain Pluripotency and Proliferative Potential for Prolonged Periods of Culture," Dev. Biology, 227:000-000 (2000)
	AN	Andrews, P., "Retinoic Acid Induces Neuronal Differentiation of a Cloned Human Embryonal Carcinoma Cell Line in Vitro," Dev. Biol., 103:285 (1984)
	AO	Baribault, H., et al., "Embryonic Stem Cell Culture and Gene Targeting in Transgenic Mice," Mol. Biol. Med. 6:481 (1989)
	AP	Becton Dickinson, "Product Specification Sheet: Matrigel Basement Membrane Matrix, Phenol-Red Free"
	AQ	Berger, C., et al., "Self Renewal of Embryonic Stem Cells in the Absence of Feeder Cells and Exogenous Leukaemia Inhibitory Factor," Growth Factors, 14:145 (1997)
	AR	Bodnar, A., et al., "Extension of Life-Span by Introduction of Telomerase into Normal Human Cells," Science, 279:349 (1998)
	AS	Bongso, A., et al., "Improved Quality of Human Embryos When Co-Cultured with Human Ampullary Cells," Hum. Reprod., 4:706 (1989)
	AT	Bradley, A., et al., "Modifying the Mouse: Design and Desire," Biotechnology, 10:534 (1992)
	AU	Brook, F., et al., "The Origin and Efficient Dirivation of Embryonic Stem Cells in the Mouse," Proc. Natl. Acad. Sci., 94:5709 (1997)
	AV	Carnegie, J., "Immonolocalization of Fibronectin and Laminin Within Rat Blastocysts Cultured Under Serum-
	AV	Free Conditions," J. Reprod. Fert., 91:423 (1991)
	AW	Carninci, P., et al., "High-Efficiency Full-Length cDNA Cloning," Methods Enzymol., 303:19 (1999)
	AX	Clontech Laboratories, SMART cDNA Library Construction Kit, Catalog #K1051-1
	AY	Corrick, C., et al., "Construction of a Mouse Blastocyst cDNA Library by PCR Amplification From Total RNA," Molecular Reproduction and Development, 43:7 (1996)
	AZ	Deleersnijder, W., et al., "Isolation of markers for chondro-osteogenic differentiation using cDNA library subtraction. Molecular cloning and characterization of a gene belonging to a novel multigene family of integral membrane proteins", J Biol Chem, 271:19475 (1996)
	ВА	Eisen, M., "Cluster Analysis and Display of Genome-wide Expression Patturns," Proc. Natl. Acad. Sci., 95:14868 (1998)
	ВВ	Elges, R., et al., "Establishment of Human Embryonic Stem Cell-Transfected Clones Carrying a Marker for Undifferentiated Cells," Curr Biol, 11:514 (2001)
2	вс	Evans, M., et al., "Establishment in Culture of Pluripotential Cell from Mouse Embryos," Nature, 292:154 (1981)
	BD	Fenderson, B., et al., "Carbohydrate Antigens of Embryonal Carcinoma Cells: Changes Upon Differentiation," APMIS Suppl. 27, 100:109 (1992)
	BE	Finley, M., et al., "Synapse Formation and Establishment of Neuronal Polarity by P19 Embryonic Carcinoma Cells and Embryonic Stem Cells," J. Neuroscience, 16:1056 (1996)
	BF	Gardner, D., et al., "Culture and Transfer of Human Blastocysts Increases Implantation Rates and Reduces the Need for Multiple Embryo Transfers," Fertil. Steril, 69:84 (1998)
	BG	Gendall, A., et al., "Isolation and Characterization of a Leukemia Inhibitory Factor-Independent Embryonic Stem Cell Line," Int. J. Biochem Cell Biol., 29:829 (1997)
	вн	Gendron, R., et al., "Induction of Embryonic Vasculogenesis by bFGF and LIF in Vitro and in Vivo," Developmental Biology, 177:332 (1996)

Examiner	Date Considered

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Title: Techniques for Growth and Differentiation of Human Pluripotent

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Information Disclosure

Stem Cells Inventors: Carpenter, M.K., et al.

Statement By Applicant

(Use Several Sheets if Necessary)

Filing Date: 23 October 2001 Group: To Be Assigned

Examiner Initial	Ref.	Author, Title, Date, Source
	ВІ	GibcoBrl Life Technologies Catalogue and Ref. Guide, pages 1-2 through 1-4, 1-94 and 1-95 (1993)
	BJ	Itoh, M., et al., "Automated Filtration-Based High-Throughput Plasmid Preparation System," Genome Res., 9:463 (1999)
	вк	Itskovitz-Eldor, J., et al., "Differentiation of Human Embryonic Stem Cells into Embryoid Bodies Comprising the TI Embryonic Germ Layers," Mol. Med., 6:88 (2000)
	BL	Keller, G., "In Vitro Differentiation of Embryonic Stem Cells," Cell Biology, 7:862 (1995)
	вм	Kelly, DL., et al., "DNA Microarray Analyses of Genes Regulated During the Differentiation of Embryonic Stem Ce Mol Reprod. Dev., 56:113 (2000)
	BN	Ko, M., et al., "Large-scale cDNA analysis Reveals Phased Gene Expression Patterns During Preimplantation Mo Development," Development, 127:1737 (2000)
	во	Koshimizu, U., et al., "Functional Requirement of gp130-mediated Signaling for Growth and Survival of Mouse Primordial Germ Cells In Vitro and Derivation of Embryonic Germ (EG) Cells," Development, 122:1235 (1996)
	BP	Koshimizu, U., et al., "Rapid Communication Retinoic Acid Is a Potent Growth Activator of Mouse Primordial Gern Cells in Vitro," Developmental Biology, 168:683 (1995)
	BQ	Life Technologies, Inc., "SuperScript II; Rnase H Reverse Transcriptase," Product Brochure; pages 1-4
	BR	Matsuda, T., et al., "STAT3 Activiation is Sufficient to Maintain an Undifferentiated State of Mouse Embryonic Steller," EMBO J., 18:4261 (1999)
	BS	Matsui, Y., et al., "Derivation of Pluripotential Embryonic Stem Cells from Murine Primordial Germ Cells in Culture Cell, 70:841 (1992)
	вт	Nichols, J., et al., "Establishment of Germ-line-Competent Embryonic Stem (ES) Cells Using Differentiation Inhibit Activity," Development, 110:1341 (1990)
	BU	Nichols, J., et al., "Derivation of Germline Competent Embryonic Stem Cells with a Combination of Interleukin-6 ar Soluble Interleukin-6 Receptor," Experimental Cell Research, 215:237 (1994)
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	вw	Pease, S., et al., "Isolation of Embryonic Stem (ES) Cells in Media Supplemented with Recombinant Leukemia Inhibitory Factor (LIF)," Developmental Biology, 141:344 (1990)
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	BY	Pedersen, R., "Studies of In Vitro Differentiation with Embryonic Stem Cells," Reprod. Fertil. Dev., 6:543 (1994)
	BZ	Pedersen, R., "Embryonic Stem Cell for Medicine," Scientif. Am., 280:68 (1999)
		Rathjen, J., et al., "Formation of a Primitive Ectoderm Like Cell Population, EPL Cells, from ES Cells in Response Biologically Derived Factors," J. of Cell Sci., 112:601 (1999)
	CB	Rehman, N., et al., "Development of IVM-IVF Produced 8-Cell Bovine Embryons in Simple, Serum-Free Media Afte Conditioning or Co-Culture With Buffalo Rat Liver Cells," Mol. Repro. Dev, 38:251 (1994)
	cc l	Reubinoff, B., et al., "Embryonic Stem Cell Lines From Human Blastocysts: Somatic Differentiation In Vitro," Nat. Biotechnology, 18:399 (2000)
	CD	Robertson, E., "Derivation and Maintenance of Embryonic Stem Cell Cultures," Methods in Mol. Bio., 75:173 (1997
	CF	Rose, T., et al., "Oncostatin M (OSM) Inhibits the Differentiation of Pluripotent Embryonic Stem Cells In Vitro,"

Examiner	Date Considered

Form 1449 (modified)

Docket: 091/009C

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Information Disclosure stile: Techniques for Growth and Differentiation of Human Pluripotent Stem Cells

Inventors: Carpenter, M.K., et al.

(Use Several Sheets if Necessary)

Statement By Applicant

Filing Date: 23 October 2001

Group: To Be Assigned

Examiner Initial	Ref.	Author, Title, Date, Source
	CF	Shamblott, M., et al., "Human Embryonic Germ Cell Derivatives Express a Broad Range of Developmentally Distinct Markers and Proliferate Extensively in Vitro," PNAS, 98: 118 (2001)
	CG	Shamblott, M., et al., "Derivation of Pluripotent Stem Cells from Cultured Human Primordial Germ Cells," Proc. Natl. Acad. Sci. USA, 95:13726 (1998)
	СН	Smith, A., et al., "Inhibition of Pluripotential Embryonic Stem Cell Differentiation by Purified Polypeptides," Nature, 336:668 (1998)
	CI	Smith, A., et al., "Buffalo Rat Liver Cells Produce a Diffusible Activity Which Inhibits the Differntiation of Murine Embryonal Carcinoma and Embryonic Stem Cells," Dev. Biol., 121:1 (1987)
	CJ	Sigma, Product Information for Laminins for Cell Culture
	СК	Takahashi, N., et al., "Toward a Whole cDNA Catalog: Construction of an Equalized cDNA library from Mouse Embryos," Genomics, 23:202 (1994)
	CL	Thomson, J., et al., "Embryonic Stem Cell Lines Derived from Human Blastocysts," Science, 282:145 (1998)
	СМ	Thomson, J., et al., "Neural Differentiation of Rhesus Embryonic Stem Cells," APMIS, 106:149 (1998)
	CN	Thomson, J., et al., "Isolation of a Primate Embryonic Stem Cell Line," Proc. Natl. Acad. Sci. USA, 92:7844 (1995)
	СО	Thomson, J., et al., "Primate Embryonic Stem Cells," Current Topics in Developmental Biology, 38:133 (1998)
	СР	Vassilieva, S., et al., "Establishment of SSEA-1- and Oct-4-Expressing Rat Embryonic Stem-like Cell Lines and Effects of Cytokines of the IL-6 Family on Clonal Growth," Exper. Cell Research, 258:361 (2000)
	cq	Worrall, D., et al., "A Carrot Leucine-Rich-Repeat Protein That Inhibits Ice Recrystallization," Science, 282:115 (1998)
	CR	Wenk, J., et al., "Glycolipids of Germ Cell Tumors: Extended Globo-Series Glycolipids are a Hallmark of Human Embryonal Carcinoma Cells," Int. J. Cancer, 58:108 (1994)
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	СТ	Woltjen, K., et al., "Retro-recombination Screening of a Mouse Embryonic Stem Cell Genomic Library," Nucleic Acids Research, 28:e41 (2000)
	CU	Xiong, J., et al., "Large-Scall Screening for Developmental Genes in Embryonic Stem Cells and Embryoid Bodies Using Retroviral Entrapment Vectors," Dev. Dynamics, 212:181 (1998)
	cv	Zandstra, P., et al., "Leukenia Inhibitory Factor (LIF) Concentration Modulates Embryonic Stem Cell Self-Renewal and Differentiation Independently of Proliferation," Biotechnol. Bioeng., 69:607 (2000)

Examiner	Date Considered